**Case Study: Penicillin and Antibiotic Resistance**

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In 1928, Sir Alexander Fleming was doing experiments to find what destroys bacteria. He observed that on the Petri dishes where mold was growing, the *Staphylococcus aureus* bacteria adjacent to the mold were being dissolved. He then grew the mold in pure culture and found that it produced a substance that killed bacteria. This substance is what we know today as the antibiotic, **penicillin**.

**Activity 1: Below is Sir Alexander Fleming’s Petri dish. Shade in the bacterial distribution that he observed.**

Mold

Penicillin was especially useful to treat bacterial infections during World War II. After the war, penicillin was also a common antibiotic that doctors prescribed to treat common bacterial infections. However, as early as 1942, reports began to show that patients were developing resistance to penicillin.

**Activity 2: Create a graph based on the following set of values and answer the following questions.**

|  |  |
| --- | --- |
| Year | Percentage Resistant to Penicillin |
| 1950 | 3 |
| 1960 | 6 |
| 1970 | 8 |
| 1980 | 15 |
| 1990 | 25 |
| 2000 | 37 |
| 2010 | 52 |

1. What trend is displayed from the graph? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Propose an explanation for this trend. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Observe the following table and answer the following questions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Number of Bacteria in Each Strain | | | |
| Days after Penicillin Use | Green | Red | Yellow | Orange |
| 0 | 17 | 10 | 11 | 0 |
| 1 | 5 | 9 | 8 | 0 |
| 2 | 3 | 8 | 8 | 2 |
| 3 | 1 | 7 | 9 | 3 |
| 4 | 1 | 7 | 10 | 5 |
| 5 | 0 | 5 | 8 | 11 |
| 6 | 0 | 5 | 7 | 15 |
| 7 | 0 | 4 | 5 | 23 |

1. Based on the following table, which strain of bacteria is MOST affected by the penicillin? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Based on the following table, which strain of bacteria is LEAST affected by the penicillin? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Propose an explanation for the appearance of orange bacteria after two days of penicillin use.

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1. What would happen if you stopped taking penicillin after Day 2?

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1. Today, penicillin is considered one of the weaker antibiotics. Explain why scientists have developed stronger antibiotics to fight similar bacterial infections.

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1. Why do you think doctors recommend that patients finish their antibiotics?

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